MONTHLY WEATHER REVIEW,

MARCH, 1875.

WAR DEPARTMENT,

Office of the Chief Signal Officer,

DIVISION OF

TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

INTRODUCTORY.

The present summary of the weather for March is compiled from the regular tri-daily observations of the United States Signal Service stations, the regular Canadian observations and a large mass of the Volunteer Observers' reports, together with manuscript, marine and other occasional communications. The observable characteristics of the meteorology of March are the following: First, the disastrous tornadoes which, on the 20th, visited the States of Alabama and Georgia, and thence passed off towards the Carolinas; second, the general liquidation of the winter's accumulation of ice and snow in the valleys of those rivers which drain the eastern and western slopes of the Alleghany and Blue Ridge mountain-chains; third, the unusually heavy ice-drifts and icebergs which were reported off the coasts of North America; fourth, the very heavy rain-fall in the cotton-producing regions of the Southern States; fifth, the unusually low temperature and late spring.

ATMOSPHERIC PRESSURE.

Chart No. II, by its isobarometric lines, graphically exhibits the average pressure of the atmosphere in the various districts during March. From these lines of equal pressure, it is seen, that the area or belt of highest pressure for March stretches along the Atlantic coast from Florida towards Cape Cod.

(1) *Areas of high barometer.*—The surface-currents of cold air from the frigid regions of British America, so conspicuous in February, were evidently checked as the month of March advanced, and the areas of high barometer grew less and less marked. During March, there were no such very high barometers as were reported (viz., 30.92 inches, 30.96 inches, and 30.98 inches, on February 6th) in the preceding month. The principal areas of high barometer may be thus enumerated:

No. 1, emerging from the Northwest on the 2d of March, and slowly advancing southeastwardly through the upper Mississippi valley, and thence extending eastward on the 3d, over the Lakes and New England, but apparently divided by low barometer No. II, which approached the Lakes from the Gulf region. This high barometer was evidently due to a very broad but shallow surface-current of cold air, flowing from British America southward over the Northwest, the Lakes and New England, being partly obstructed, as most of the areas of high barometer are, by the "Height of Land" or elevated wall, running north of the St. Lawrence river and the Lakes. After the passage of low barometer No. II. to the east, the pressure from high barometer No. 1 was soon propagated from the Lakes to the Gulf States.

No. 2, although not marked by very high pressure, had, on the afternoon of the 8th, extended itself almost entirely over the whole country east of the Mississippi valley, and, at midnight of the same day, was central over the Alleghany belt.

No. 3 was a minor area of high pressure, which moved across the Gulf States on the 9th and 10th, and on the 11th disappeared off the South Atlantic coast.

No. 4. During the 15th of March the pressure increased, generally, in a long line from north to south, west of the Mississippi river. On the 16th, this area of high barometer remained west of the Mississippi from Dakota to Louisiana. On the 17th, it advanced slowly eastward, the southern portion of the high pressure belt becoming detached in the Gulf States, and moving southeastwardly, while storm-centre No. VIII, coming up from the far Southwest, intervened between it and the main or northwestern portion of the high pressure area. On the night of March 18th, the barometer in the Northwest rose as high as 30.61 inches; meantime the southern storm-centre (No. VIII) was in Louisiana. This storm-centre came in, therefore, between two areas of high pressure, and this fact is of great interest in studying and elucidating the tornadoes which followed in the train of storm-centre No. VIII, and, on the 20th instant, inflicted so much damage and disaster in Alabama, Tennessee and Georgia.

No. 5. The next noticeable high pressure area appears on the Weather Map for March 22, 7:35, A. M., when the barometric readings for the whole interior of the country, (from the Lakes, Wisconsin and Iowa to the Gulf coast,) are high. This area is seen during the day of the 22d, in a more concentrated form, central in the Ohio valley and moving eastward. On the 23d, this area passed slowly over the Alleghanies and the Middle States, gradually disappearing in the Atlantic on the 24th.

No. 6. Still another area of high pressure commenced advancing from the northwest on the night of the 23d, and progressed eastward, becoming central in the lower Ohio valley at midnight of the 24th. Thence, on the 25th, it crossed Tennessee and North Carolina, and left the Carolina coast on the 26th.

No. 7. One more important area of high barometer passed, on the 27th, over the Northwest and Upper Lake region; and on the 28th, at 7.35, A. M., was central just north of Lake Ontario, whence, during that day and the following, it made its way to New England and the Middle States, where it remained nearly stationary, with northeasterly and southeasterly winds and partly cloudy weather, till after the month closed. The meteorological effects of this area will come into further notice in the study of the April weather.

(2.)—The following were the only depressions worthy of notice in the Review:

No. I. The first storm-centre of the month passed rapidly, during the morning of March 1st, from eastern Missouri to the middle of the Ohio valley; thence, during the afternoon and evening, to Pittsburgh; and between midnight of the 1st and the morning of the 2d, it moved off the New England coast. This storm-centre was attended with heavy rains in the Southern and Gulf States and Tennessee, with high winds, sleet and snow on the middle and eastern Atlantic coasts, and with heavy snows in the Lake region and the upper Mississippi valley, and heavy rains in the Ohio valley. The Ohio and its tributaries rose considerably after the passage of the disturbance.

No. II was slightly developed in the western Gulf on the morning of the 2d, but its cyclonic influence was not marked till the afternoon of that day, when high, northerly

winds and cold weather were reported from the western Gulf, and warm southerly and easterly winds and rain from the eastern Gulf and south Atlantic States. This depression moved northward rapidly, crossing the Ohio river about midday of the 3d, a little east of Cincinnati, and thence, curving north of Pittsburgh, its course lay somewhat south of east, and, during the night of the 3d, it disappeared off the New Jersey coast. Very high winds accompanied it on the Atlantic coast, the anemometer showing gales of forty miles an hour at Sandy Hook and Long Branch, and fifty miles an hour at Squan Beach. Heavy rains fell along its pathway from Mississippi to Kentucky, and snow and sleet prevailed north of the Ohio valley and over the Middle and Eastern States.

No. III. The next definite depression comes into view on the midnight of the 4th, preceded by a light snow in the lower Missouri valley. Though not an obscure depression, this disturbance was less marked than its two predecessors; it moved more slowly forward, and its rains and winds were more moderate.

No. IV. On the morning of the 6th a storm-centre of more decided features appeared on the Gulf coast south of Louisiana, preceded by rain and easterly winds in Mississippi and Alabama. The path of this storm lay almost due northeast, through Alabama, East Tennessee and Virginia, and thence off the Atlantic coast towards Halifax, which it reached on the evening of the 8th, having kept up nearly a uniform progressive velocity. The rain-fall along its route was very great, as will be seen by some of the reports: At Knoxville, .86 inch of rain fell in 24 hours; at New Orleans, 1.20 inches in 24 hours; at Montgomery, Alabama, 2.02 inches in 24 hours; at Norfolk, 2.78 inches in 24 hours; at St. Marks, Florida, 2.84 inches in 24 hours. In the Mississippi valley, snow fell at and south of Memphis, and a severe "norther" (in which the wind blew 60 miles an hour) prevailed on the afternoon and evening of the 6th, off the Texas coast. As the gale approached the Atlantic coast, very high winds and heavy seas were experienced, with occasional gales blowing from 40 to 50 miles an hour, and heavy rains and snows in the Middle and Eastern States, extending west to the central Ohio valley.

No. V. On the 8th, another depression, accompanied by snow, began to move from the Northwest across the Lake region; though in its Lake-track considerable snow fell, it was not otherwise worthy of notice.

No. VI is first seen on the Weather Maps on the afternoon of the 10th, during which it developed into a trough-shaped depression, running north and south from Dakota toward Kansas. During the morning of the 11th, it was passing, in a more concentrated form, across Iowa; and, on the evening of that day, appeared on the eastern side of Lake Michigan, whence its track lay nearly due northeastward, and it disappeared during the afternoon of the 12th, north of the St. Lawrence valley. There is nothing else special to note concerning it.

No. VII pursued an eccentric course, and with a progressive velocity frequently varying. It entered the field of observation in Dakota on the 12th, and moved southeast to Eastern Kansas, where its centre was nearly stationary, in the vicinity of Leavenworth, for twenty-four hours. Its path thence runs northeastwardly to Toledo and Detroit, from which points it passed in a northerly direction over Lake Huron, and thence nearly due eastward over Canada, not leaving the Atlantic coast till the evening of the 18th. So slow was its motion, and yet low the barometer, that this depression drew toward it large masses of warm, moist air from the Gulf and South Atlantic regions. Drawn

toward the interior and Appalachian Mountains in the shape of vapor-laden southerly winds, these warm volumes of air served to liquify the mountain-ices and snow—the accumulation of the winter—and, dislodging immense quantities of ice along the already rain-swollen rivers that drain the Appalachian slopes, very dangerous ice-gorges and floods were produced in these streams. This result was, of course, intensified by the warm and copious rains that fell over nearly the whole country from the Gulf to the Lakes and New England, during the deliberate passage of this storm-centre. This depression was followed by heavy snow-storms in the Lake region and the Northwest.

No. VIII. This storm was the most important in its consequences and far-reaching disturbances, that occurred during March. It formed and manifested itself slowly in the Western Gulf region during the 17th and 18th, and moved slowly through Louisiana on the 19th. Its centre advanced rapidly northeastward from the vicinity of Vicksburg on the evening of the 19th, reaching the interior of Kentucky on the morning of the 20th, and thence progressing in a more easterly direction, reached Eastern Virginia in the afternoon of the same day. From this district it appears to have progressed in a southeasterly course toward Cape Hatteras, and to have started on its Atlantic track upon or about the 33rd parallel of north latitude. Very heavy rains fell in the Gulf and South Atlantic States on the 19th and 20th. The storm, as it neared the Atlantic coast, produced, by its indraught, high and dangerous easterly winds. But its most serious consequences were felt in Alabama, Georgia and South Carolina, in the shape of a series of fearful TORNADOES.

These TORNADOES, perhaps four in number, occurred with most disastrous results over the country between central Alabama and central South Carolina, about noon and in the afternoon of March 20th. One of these storms entered Harris county, Georgia, from Lee county, Alabama, about noon. A wind-storm was reported at Atlanta, early in the day, and followed by hail at 1 P. M. One of these tempests appears to have divided near Hancock county, Georgia, one part going east on a track more northerly than that of the other.

But the effects of this remarkable storm are apparently traceable beyond the United States, and as far east on the ocean as the Bermuda Islands. On the 21st of March, the observer reports a gale from the Southwest set in at St. George's, the wind in the afternoon rising to 61 miles an hour, with a falling barometer. On the 22d of March, the barometer still falling slowly, the wind was still very high, and, at 5 P. M., a thunderstorm passed to the southward. On the 23d, at 12.30 A. M., the wind shifted to northwest suddenly, and at 1.30 A. M., the velocity was 81 miles an hour, with squally weather and rain. There is, therefore, reason to suppose that the general depression which passed off the Carolina coast on the 20th, was felt at the Bermudas on the 21st, 22d and 23d.

No. IX. On March 22d, the afternoon reports showed a depression in Dakota, moving slowly southeastward. Its track is given on the Storm-Chart, but it does not appear to have been of any special importance.

No. X passed from Dakota north of the Lakes, and thence eastward through the St. Lawrence valley, with no very noteworthy phenomena.

No. XI. On the 28th, the barometer was low west of the Mississippi river, and, on the night of the 29th, there was a noticeable depression, central in Nebraska, which, on

the 30th, passed slowly over the Upper Lake region, remaining nearly stationary during the afternoon and night of the 30th, and rapidly moving to the northeastward early on the morning of the 31st.

ATMOSPHERIC TEMPERATURE.

Chart No. II expresses graphically (by the red isothermal lines) the mean distribution of temperature for March; and the table in the left-hand lower corner gives, numerically, the actual and comparative severity and mildness of the temperature for the various districts. The isotherms of 20° (running through the Lake region and the St. Lawrence valley) and 60° (running through the Gulf States) indicate the extreme thermometric means for March. The means for the St. Lawrence valley, the Middle States, the whole Lake region and Upper Mississippi valley, are all 5° or more below those of many years, evidencing the extraordinary severity and protractedness of the winter's cold. In only one district east of the Rocky Mountains (i. e. the South Atlantic States) has the temperature been as high as usual for the month. The lateness of the spring is specially marked in the lower Missouri valley, and is also observed in New England and the Northwest. The abnormal cold of this month is the lingering result of the intensely severe winter, and is not ascribable to any physical causes operating in March. The isothermal lines run nearly due east and west, with no southward deflection in the Mississippi valley, due to areas of high barometer and low temperature descending from the Northwest. A comparison of the isothermal lines for February and March shows that, during the latter month, the mean rise of temperature over the United States was from 5° to 10° Fahrenheit.

PRECIPITATION.

On Chart No. III is shown the distribution of rain and melted snow for March. It will be seen from this that a very large excess of rain fell in the lower Mississippi valley, the Gulf and South Atlantic States and Tennessee. In these districts the fall amounted, in some localities, to 12 or 14 inches and more. There was also a very unusual quantity of water precipitated in southern and central Virginia. The minimum fall occurs in the Florida peninsula; but in the other portions of the South Atlantic States a very great excess fell, the total amount in Georgia occasionally exceeding 10 inches. The largest excess is in Tennessee, where the month's rainfall has been more than double the usual quantity. The only deficiency, and that an insignificant one, is in the Lower Lake region. This immense and general rainfall is attributable to the large evaporation of ice and snow and the moist southerly winds encountering, in their movements, the condensing influence of a continent chilled to an unusual degree by the excessive cold of January and February.

The number of days on which rain fell during the month, in the several districts, averages as follows: In New England, 15 days; in the Middle Atlantic States, 15; in the South Atlantic States, 14; the Gulf States, 12; the Lake region, 15; the Ohio valley and Tennessee, 15, and in the Northwest, 11 days.

HUMIDITY.

The average relative humidity for the various districts is as follows: For New England, 73 per cent.; Middle Atlantic States, 76; South Atlantic States, 72; the Eastern Gulf States, 74; Western Gulf States, 71; Lower Lakes, 75; Upper Lakes, 73; Ohio valley and Tennessee, 67; Upper Mississippi valley, 74; the Lower Missouri valley, 72; and Minnesota, 77.

WINDS.

The mean direction of the wind at the different stations of the Signal Service is shown on Chart II by the arrows, each arrow flying with the prevailing wind. The total movement in miles of the atmosphere, in all directions, as recorded by the anemometer at each station during March, furnishes some interesting maxima and minima. The following maxima may be specially mentioned: Cheyenne, 11,615 miles; Cape Henry, 10,100; Long Branch, 9,916; Breckenridge, Minnesota, 11,906; Erie, 12,042; Indianola, 10,495; Omaha, 9,353; Sandy Hook, 11,050. Among the chief minima are Baltimore, 3,800 miles; Augusta, 4,270; Lynchburg, 3,472; Nashville, 4,674; Pittsburgh, 4,806.

TEMPERATURE OF WATER.

This element is presented by the table on the lower right-hand of Chart No. II. The table gives the maximum and minimum temperatures of the water at the different Lake, River and Sea-coast Stations, the observations having been taken at the bottom.

VERIFICATIONS.

(1) The careful comparison of the published predictions (or Probabilities) with the weather following, as reported by telegraph, gives as the average of verifications 83.7 per cent. The average percentage of omissions to predict was 1.9.

(2) During the month of March there were displayed, at United States ports, 162 Cautionary Signals or Storm-warnings. Of this number 28 were not justified; the remainder, 134, were justified. The percentage of justification, therefore, was 83.7. There were reported seven storms for which no warning signals were ordered. During March no Cautionary Signals were displayed on the Lakes, because of the suspension of navigation. Their display will be resumed on the 15th of April.

NAVIGATION.

A tabular exhibit of the oscillations of the rivers is given on Chart No. III. The remarkable ice-blockade on the coast from Cape Henry to Halifax, noted in the February Weather Review, was raised almost entirely about the first of March. But the European steamships arriving at United States ports in March reported unusually enormous ice-fields and icebergs, floating southward off the Atlantic coast.

(1) *The breaking up of Ice and re-opening of Navigation* has taken place as follows: At Rockford, Illinois, on the 31st; at Havana, Illinois, on the 26th; at Muscatine, Iowa, the Mississippi opened on the 31st, and at Fort Madison, Iowa, on the 29th; the Iowa river, at Iowa City, on the 14th; at Ellenwood, Kansas, on the 6th; at Lansing, Michigan, ice went out of Cedar river on the 31st; at Plattsmouth, Nebraska, ice broke in Platte river on the 14th, and in the Missouri river the 25th; at De Soto, Nebraska, the Missouri broke on the 29th; at Clear Creek, Nebraska, on the 30th; at Nichols, New York, the Susquehanna broke on the 16th; at Tioga, Pennsylvania, the Tioga river broke on the 15th; at Cleveland, Ohio, river cleared on the 16th; at Pennville, Pennsylvania, on the 16th; at Beloit, Wisconsin, ice cleared on the 29th; at Davenport, Iowa, the river was partly opened on the 30th; at Keokuk, river broke on the 14th; at Sandy Hook, the ice moved out on the 7th; at Toledo, on the 29th; at Leavenworth, river was cleared on the 16th; at Detroit, ice broke up on the 8th.

ATMOSPHERIC ELECTRICITY.

Thunder-storms occurred principally as follows: On the 1st and 2d, in the South Atlantic and Gulf States, Indiana, Kansas, Kentucky and Missouri; on the 3d, in Georgia and Mississippi; on the 4th and 5th, in Mississippi, Louisiana and Ohio; on the 7th, from Georgia to New Jersey; on the 12th, in Indiana, Kentucky, Maryland and Tennessee; from the 13th to the 16th, they were quite general, except in New England. From the 23d to the close of the month, they were frequently reported from the southern and interior districts. Between 300 and 350 thunder-storms have been reported during March.

Auroras were comparatively few in number. They were seen on the 1st, in Vermont and Minnesota; on the 2d, in Iowa, Michigan, Minnesota, Nebraska, New York, Wisconsin, Pennsylvania and Massachusetts; on the 3d, in Iowa, Vermont and Massachusetts; on the 6th, in Wisconsin; on the 7th, in Michigan and Wisconsin; on the 8th, in New Hampshire and Ohio; on the 21st, in New York; on the 23d, in Kansas; on the 28th, in Maine, New York, Vermont, Wisconsin, Massachusetts and Michigan; on the 29th and 30th, in Vermont.

OPTICAL PHENOMENA.

Solar Halos were observed frequently, *e. g.*, at Savannah, on the 2d, 11th, 17th, 18th, 24th and 27th; Eastport, Maine, 13th and 31st; Rochester, 11th, 28th, 29th and 30th; Springfield, Massachusetts, 9th; Morgantown, West Virginia, 18th; Erie, 29th; Wood's Hole, Massachusetts, 7th; St. Louis, 10th; Leavenworth and Mobile, the 17th; New London, 25th; Mt. Washington, 11th; Fort Gibson, the 12th; Wilsonville, Ala., 11th and 13th; Hutchinson, Col. Ter., 31st; Southington, Conn., 26th; Rockford, Ill., 17th; Riley, Ill., 4th, 12th and 18th; at Wyanet, Ill., on the 12th, 16th and 17th; at Lebanon, Ill., 10th; Rising Sun, Ind., 18th; South Bend, Ind., 31st; Rockfork, Iowa, 3d; Afton, Iowa, 4th and 19th; Guttenberg, Iowa, 3d, 4th, 7th and 10th; Independence, Iowa, 3d, 4th and 17th; Cresco, Iowa, 4th and 7th; Holton, Kansas, 17th; at Ellenwood, Kansas, 17th, 18th and 27th; Cornish, Maine, 1st, 3d, 5th, 11th 14th and 28th; Standish, Maine, 3d, 18th, 24th, 25th, 26th, 28th and 30th; Mt. Desert, Maine, 14th; Oxford, Maine, 18th; Newburyport, Mass., 28th; Somerset, Mass., 14th; Andover, 1st; Florida, Mass., 9th; Fall River, 29th; Detroit, 4th; Lansing, 29th; Warrensburg, Mo., 22d, 23d, 26th and 27th; Howard, Neb., 4th, 9th, 15th, 16th and 17th; Auburn, N. H., 1st, 3d, 6th, 7th, 11th, 13th, 24th and 28th; Troy, N. Y., 26th and 28th; Reading, Penn., the 2d. Solar Halos were also seen in Ohio on the 16th and 23d; Pennsylvania, 18th, 19th, 22d, 24th, 26th and 29th; Tennessee, 6th, 11th, 22d and 31st; Vermont, 11th, 24th and 26th; Virginia, 6th, 11th, 12th and 19th; Wisconsin, 4th, 5th, 8th and 10th.

Lunar Halos were reported at Wilmington, N. C., on the 11th; Buffalo, 15th and 18th; Savannah, 13th, 14th and 18th; Boston, 18th; New York and Philadelphia, 19th; Memphis, 5th; Cincinnati, 22d; Keokuk, 17th and 22d; Grand Haven, 17th, 18th and 21st; La Crosse, 13th, 16th and 20th; Eastport, 13th; Nashville, 18th; Toledo, 16th and 21st; Springfield, Mass., 6th and 22d; Louisville, 14th; Morgantown, 14th and 18th; Cairo, 17th; Erie, 18th; Indianola, 16th and 18th; Denver, 18th; Shreveport, 22d; Oswego, 23d; Atlantic City, 18th and 23d; Ecanaba, 20th; Mobile, 16th and 17th; Fort Gibson, 17th and 21st; Detroit, 16th, 18th and 21st.

Mirage, reported from Atlanta, Kansas, on the 3d, 7th and 16th inclusive, 21st, 22d, 24th, 26th, 27th and 28th; from Ellenwood, Kansas, on the 7th, 13th and 28th.

MISCELLANEOUS.

Meteors were witnessed in Louisiana on the 1st, 4th, 23d and 29th; in Pennsylvania on the 2d; in Colorado on the 6th; in Texas on the 8th; in New York on the 9th, 22d and 30th; in Mississippi on the 12th in Illinois on the 23d and 27th; in Indiana on the 26th; and in Michigan on the 29th.

Polar Bands were noted at Cleveland, Ohio, on the 8th; Atlantic City on the 27th; Fort Gibson on the 11th; Iowa City on the 6th; and at Grand Haven on the 13th.

Zodiacal Light was observed on the 29th at Ellenwood, Kansas.

Zoological.—Wild Geese were reported going northward at Cleveland on the 13th and 14th; Springfield, Mass., 18th; Morgantown, W. Va., 12th; Atlantic City, 9th; New London, 26th; Fort Gibson, 7th; St. Paul, 27th; Wilsonville, Ala., 1st; Louisville, Ill., 7th; Riley, Ill., 29th. At Wyanet, Ill., geese going southwest on the 13th; Lyndon, Ill., going north on 13th; Leesburg, Ind., north on 14th; Afton, Iowa, north on 10th; Rockford, north on 25th; Council Bluffs, north on 10th; Mt. Desert, Me., 31st; Woodlawn, Md., on 11th and 31st; Sibley, Minn., on 25th; North Hammond, N. Y., on 28th; Austin, Tex., on 22d; Lynchburg and Alta Vista, Va., on 9th; Bloomfield, Wis., on 26th. *Blue Birds* at Keokuk on 30th; Toledo on 14th; Springfield, Mass., on 11th; Hutchinson, Col., on 27th; Southington, Conn., on 10th; Galesburg, Ill., on 11th; Afton, Iowa, on 23d; Holton, Kan., on 9th; Billerica, Mass., on 30th. *Robins*, first seen at Oswego on 29th; Hutchinson, Col., on 24th; Southington, Ct., on 12th; Galesburg, Ill., on 11th; Leesburg, Ind., on 14th; Independence, Iowa, on 17th; Holton, Kansas, on 10th; Westboro', Mass., on 31st; Westerville, Ohio, on 14th. *Larks.*—Wellborn, Florida, on 26th; Genesseo, Ill., on 28th; Afton, Iowa, on 23d; Ellenwood, Kan., on 12th; Sibley, Minn., on 25th. *Martins.*—Keokuk, 30th; Morgantown, 30th; Indianola, Tex., 13th, (first of the season); Fort Gibson, 13th; Wilsonville, Ala., 30th and 31st; Wellborn, Fla., 26th. *Wild Pigeons.*—Morgantown, W. Va., 14th and 24th; Riley, Ill., 14th; Rising Sun, Ind., 30th; Guttenberg, Iowa. 25th; Northport, Mich., 31st; Jacksonsburg, Ohio, 14th; Dunbar, Pa., 12th. *Killdee* appeared at Belvidere, Ill., 29th; Fort Madison, Iowa, 29th; Ellenwood, Kan., 25th; Woodlawn, Md., 17th; Sibley, Minn., 28th. *Black Birds*—nearly about the same time as Blue Birds. *Cranes.*—North on 26th at Wellborn, Fla; Leesburg, Ind., 14th; Independence, Iowa, 31st; LeRoy, Kan., 13th. *Buzzards.*—LeRoy, Kan., 13th. *Swallows.*—Fall River, Mass., 28th. *Fire-Flies.*—Indianola, Tex., 27th; Brookhaven, Miss., 28th. *Mosquitoes.*—Ellenwood, Kan., 28th; New Orleans, 15th.

Water and Barometer Oscillations—Observations at Marquette, on Lake Superior, show that the water in the Lake oscillated sixteen times with the barometer, and seventy-seven times in a contrary manner.

PUBLISHED BY ORDER OF THE HON. WM. W. BELKNAP, SECRETARY OF WAR.

Albert J. Myer

Brig. Gen. (Bvt. Assg^{d},) Chief Signal Officer, U. S. A.

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SIGNAL SERVICE U.S.A
DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT
TRACKS OF CENTRES OF LOW BAROMET
Ft Benton
Pembina
Duluth
St Paul
Sully
Virginia City
Corinne
Humboldt City
San Francisco
Cheyenne
Denver
Omaha
Santa Fe
San Diego
Little Rock
Shreveport
Waco
Galveston
Indianola
Brownsville
VI
VII
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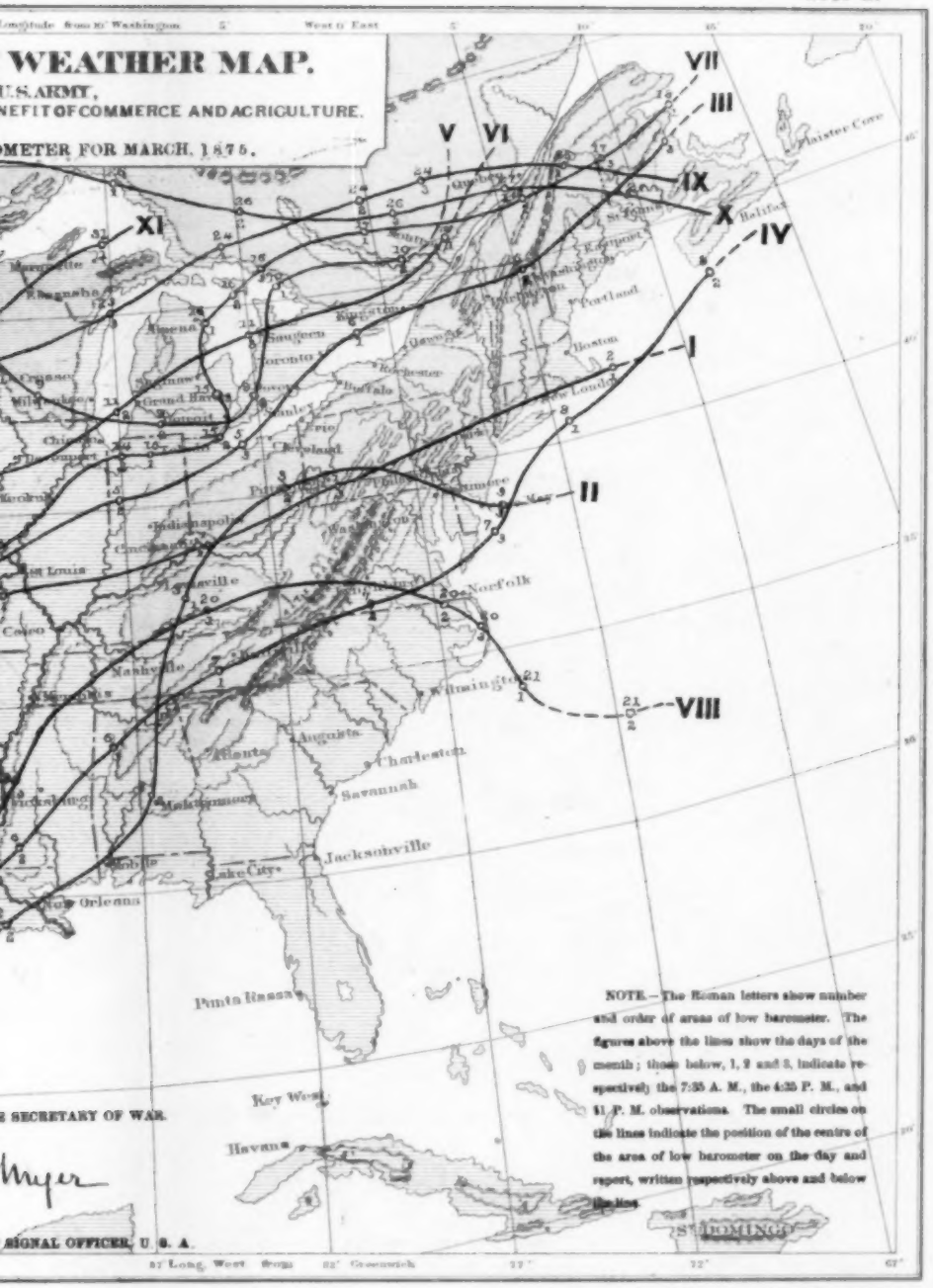
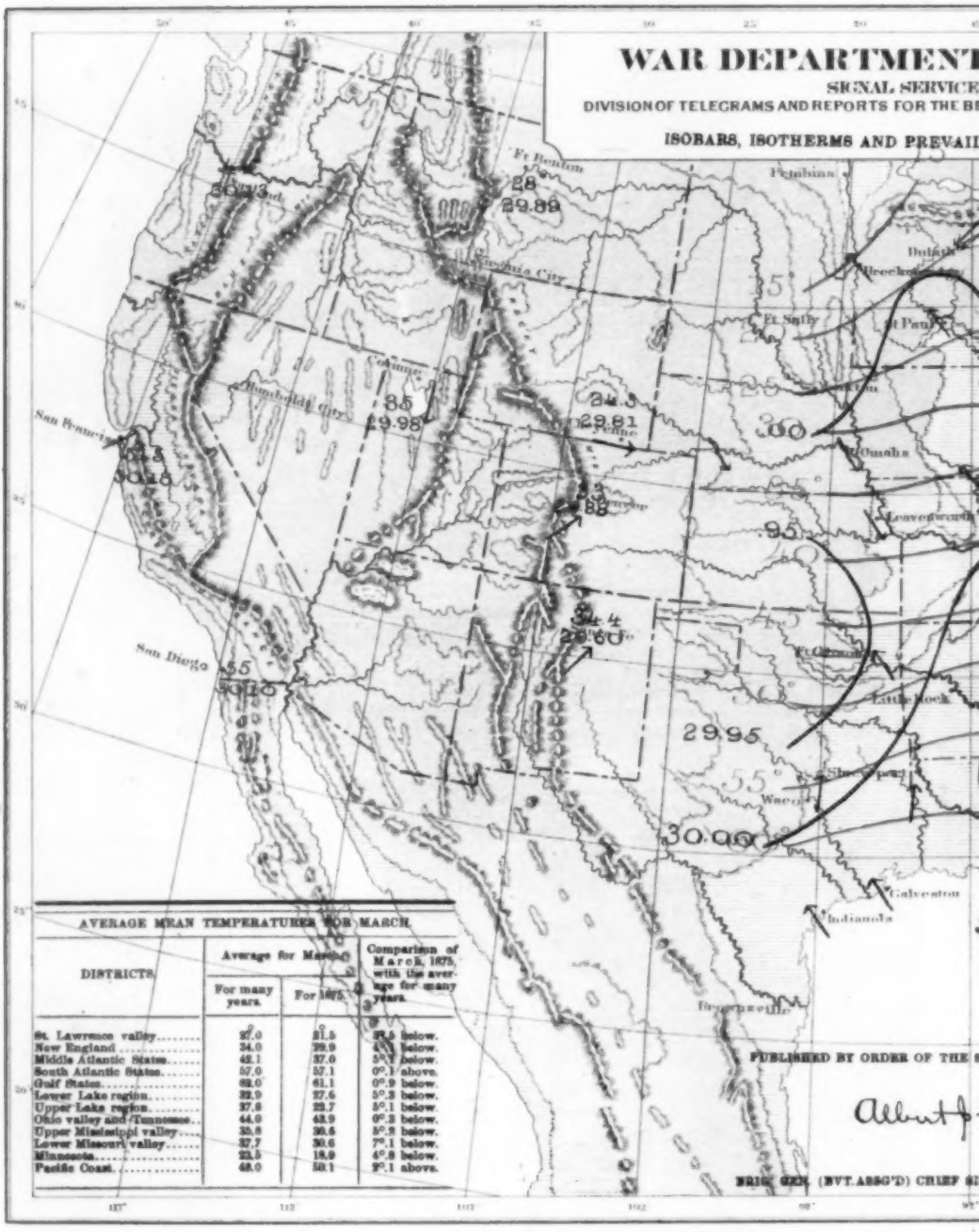
No. I.



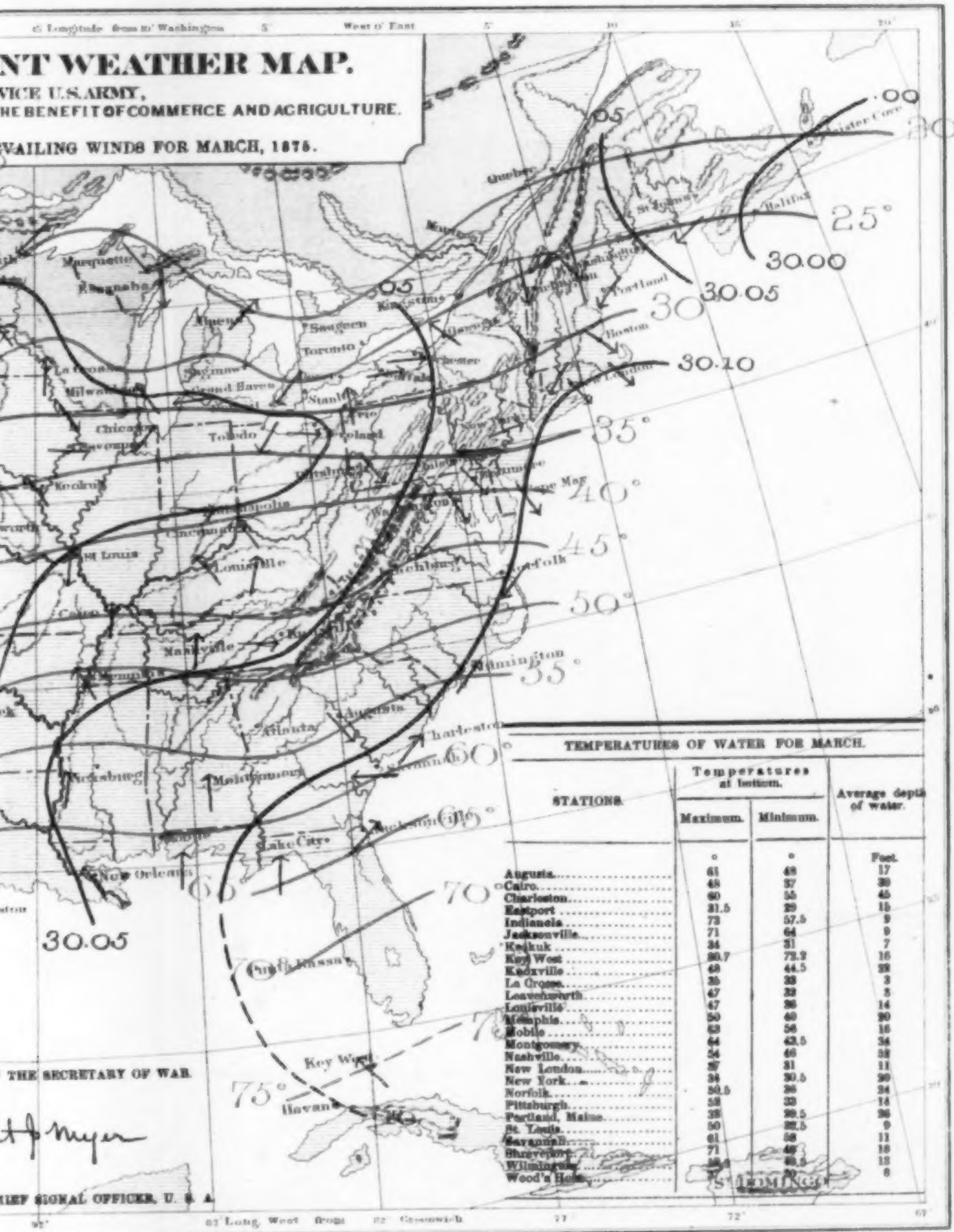
N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.



AVERAGE MEAN TEMPERATURES FOR MARCH.

DISTRICTS.	Average for March.		Comparison of March, 1875, with the average for many years.
	For many years.	For 1875.	
	°	°	°
St. Lawrence valley	27.0	31.5	4°.5 below.
New England	34.0	29.9	4°.1 below.
Middle Atlantic States	42.1	37.0	5°.1 below.
South Atlantic States	57.0	57.1	0°.1 above.
Gulf States	62.0	61.1	0°.9 below.
Lower Lake region	32.9	27.6	5°.3 below.
Upper Lake region	27.8	22.7	5°.1 below.
Ohio valley and Tennessee	44.0	43.9	0°.3 below.
Upper Mississippi valley	35.9	30.6	5°.3 below.
Lower Missouri valley	37.7	30.6	7°.1 below.
Minnesota	23.5	18.9	4°.6 below.
Pacific Coast	48.0	52.1	3°.1 above.

No. II.


NT WEATHER MAP.
VICE U.S. ARMY,
HE BENEFIT OF COMMERCE AND AGRICULTURE.
VAILING WINDS FOR MARCH, 1875.
Longitude from Washington
West East
Long. West from Greenwich
30.00
30.05
30.10
30°
25°
35°
40°
45°
50°
55°
60°
65°
70°
75°
.00
Quebec
Halifax
Portland
Boston
New London
Kingston
Oswego
Saugeen
Toronto
Marquette
Escanaba
Chicago
Milwaukee
La Crosse
Toledo
Cleveland
Keokuk
St Louis
Cincinnati
Louisville
Nashville
Knoxville
Norfolk
Wilmington
Augusta
Atlanta
Charleston
Savannah
Jacksonville
Montgomery
Lake City
New Orleans
Mobile
Punta Rassa
Key West
Havana
THE SECRETARY OF WAR
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TEMPERATURES OF WATER FOR MARCH.

STATIONS.	Temperatures at bottom. Maximum.	Temperatures at bottom. Minimum.	Average depth of water.
	°	°	Feet.
Augusta	61	48	17
Cairo	48	37	30
Charleston	60	55	45
Eastport	31.5	29	15
Indianola	73	57.5	9
Jacksonville	71	64	9
Keokuk	34	31	7
Key West	80.7	72.2	16
Knoxville	48	44.5	22
La Crosse	35	33	3
Leavenworth	47	32	3
Louisville	47	36	14
Memphis	50	40	20
Mobile	62	56	16
Montgomery	64	42.5	34
Nashville	54	46	32
New London	37	31	11
New York	34	30.5	20
Norfolk	50.5	36	24
Pittsburgh	58	33	14
Portland, Maine	35	29.5	26
St. Louis	50	32.5	9
Savannah	61	56	11
Shreveport	71	48	18
Wilmington	[illegible]	48.5	12
Wood's Hole	37	[illegible]	8

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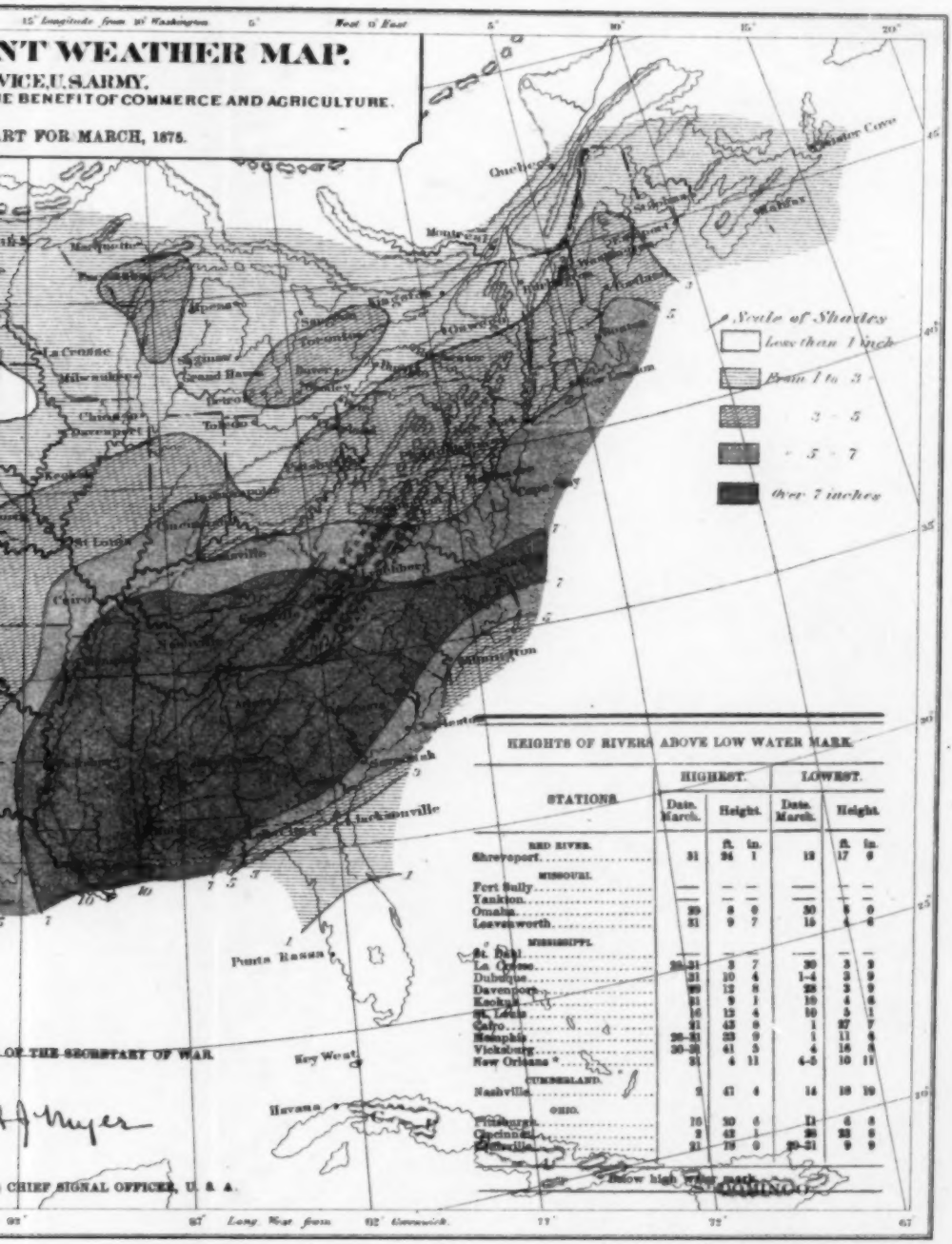
AVERAGE PRECIPITATION FOR MARCH.

DISTRICTS	Average for March. For many years	Average for March. For 1875.	March, 1875, compared with the average for many years.
	Inches.	Inches.	
St. Lawrence valley	2.75	1.91	Deficiency.
New England	3.05	3.46	Excess.
Middle Atlantic States	3.76	5.17	Excess.
South Atlantic States	4.55	6.80	Large excess.
Eastern Gulf States	4.84	5.75	Excess.
Western Gulf States	3.64	6.19	Large excess.
Lower Lake region	2.92	2.06	Deficiency.
Upper Lake region	1.91	2.96	Excess.
Ohio Valley	3.74	4.80	Excess.
Tennessee	4.18	9.94	Large excess.
Upper Mississippi Valley	2.02	2.02	Normal.
Lower Missouri Valley	1.87	1.84	Normal.
Minnesota	1.56	2.03	Excess.
Pacific Coast	2.73	3.72	Excess.



HEIGHTS OF RIVERS ABOVE LOW WATER MARK.

STATIONS.	HIGHEST. Date. March.	HIGHEST. Height. ft.	HIGHEST. Height. in.	LOWEST. Date. March.	LOWEST. Height. ft.	LOWEST. Height. in.
RED RIVER.						
Shreveport	31	34	1	13	17	9
MISSOURI.						
Fort Sully	———	—	—	———	—	—
Yankton	———	—	—	———	—	—
Omaha	29	8	0	30	5	0
Leavenworth	31	9	7	15	4	6
MISSISSIPPI.						
St. Paul	———	—	—	———	—	—
La Crosse	29-31	9	7	20	3	9
Dubuque	31	10	4	1-4	3	9
Davenport	29	12	8	28	3	9
Keokuk	31	9	1	19	4	6
St. Louis	16	13	4	10	5	1
Cairo	21	43	0	1	37	7
Memphis	28-31	23	9	1	11	4
Vicksburg	30-31	41	5	4	16	8
New Orleans *	31	4	11	4-5	10	11
CUMBERLAND.						
Nashville	2	41	4	14	19	10
OHIO.						
Pittsburgh	16	30	6	12	6	8
Cincinnati	2	43	1	28	33	6
Louisville	21	28	0	29-31	9	9

* Snow high water mark [illegible]

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